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ETHYL CORPORATION
FUEL WAIVER APPLICATION

Thursday,
September 12, 1991

APPEARANCES:

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EXECUTIVE COURT REPORTERS
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P R O C E E D I N G S

1
2 MR. WILSON: Good morning, ladies and
3 gentlemen.

4 I am Richard Wilson, Director of the Office of
5 Mobile Sources of the Environmental Protection Agency.
6 I'll chair today's hearing on the Ethyl Corporation's
7 fuel waiver application.

8 Welcome to the hearing. For the record, this
9 hearing is convened on September 12, 1991 at 9 a.m.,
10 Holiday Inn, Balston, 4610 North Fairfax Drive,
11 Arlington, Virginia.

12 The purpose of this hearing is to provide EPA
13 with oral testimony regarding the recent application by
14 Ethyl to utilize HiTEC 3000, also known as MMT, as an
15 additive to unleaded gasoline.

16 Statements by the participants will not be
17 subject to cross-examination by others who testify.
18 However, the panel may ask participants questions
19 concerning their statements.

20 The hearing will be conducted informally and
21 technical rules of evidence will not apply. A written
22 transcript of the hearing will be taken. Anyone desiring
23 to purchase a copy of the transcript should make
24 individual arrangements with the court reporter.

25 The transcript will also be placed in the

1 public docket, Docket No. A-91-46, of the Air Docket of
2 EPA. Copies of the transcript, as well as other
3 pertinent documents, may be viewed and copied at the Air
4 Docket which is located in the mall area of EPA's
5 Headquarters Building, Waterside Mall, 401 M Street, S.W,
6 Washington, D.C.

7 For the record, I'd like to clarify the status
8 of this proceed. Section 211(f)(1) of the Clean Air Act
9 prohibits the use of motor vehicle fuels and additives
10 which are not substantially similar to those used in
11 vehicle certification.

12 Section 211(f)(4) of the Act provides that,
13 upon application by any fuel or fuel additive
14 manufacturer, EPA may waive the prohibition if the
15 applicant has established that a fuel or fuel additive
16 will not cause or contribute to the failure of vehicles
17 to meet emission standards.

18 If the Administrator does not grant or deny a
19 waiver within 180 days of receipt of application -- in
20 this case by January 8, 1992 -- the statute provides that
21 the waiver shall be granted.

22 The current request by Ethyl is for a waiver to
23 blend HiTEC 3000 in unleaded gasoline resulting in a
24 level of 1/32 of a gram per gallon manganese. This is
25 Ethyl's fourth application for a waiver. The first

1 application was submitted in 1978 for concentrations of
2 1/16 and 1/32 gram per gallon manganese. The second
3 application was submitted in 1981 for a concentration of
4 1/64 gram per gallon manganese.

5 The Administrator denied these requests
6 primarily due to concerns regarding increased hydrocarbon
7 exhaust emissions.

8 Ethyl's third application was submitted on May
9 9, 1990 for the same level asked for in the current
10 submission, 1/32 gram per gallon manganese.

11 Ethyl withdrew this application on November 1,
12 1990 before the deadline for the Administrator to make a
13 decision. Because no decision had been made, EPA
14 accepted the withdrawal and terminated the proceeding.

15 If the prohibition against HiTEC 3000 were
16 waived, it is likely that most U.S. gasoline would
17 contain it, and therefore, it's also likely that the
18 certification fuel would be required to reflect this
19 compositional change.

20 At this point, I'd like to introduce the other
21 members of the hearing panel this morning. On my left is
22 Mary Smith, Director of the Field Operations Support
23 Division of EPA; on my right is Richard Lawrence,
24 Director of the Engineering Operations Division of EPA;
25 on my far left is Dwight Atkinson from our Office of

1 Policy, Planning and Evaluation; Stan Stocker-Edwards of
2 our Office of General Counsel; and on my right, Mike
3 Davis and Christ Saint of our Office of Research and
4 Development.

5 The Administrator's decision on this
6 application for waiver will be made on the basis of the
7 public record. We encourage comments on Ethyl's waiver
8 application and on today's presentation.

9 With that, we'll begin with a series of
10 witnesses who have asked to a present testimony this
11 morning, starting with the Motor Vehicle Manufacturers
12 Association.

13 STATEMENT OF DAVE KULP ON BEHALF OF
14 THE MOTOR VEHICLE MANUFACTURERS ASSOCIATION

15 MR. KULP: Good morning. My name is David
16 Kulp, Fuel Economy Planning & Compliance Manager for Ford
17 Motor Company.

18 I am here today to present the MVMA testimony
19 concerning Ethyl Corporation's fuel additive waiver
20 application for HiTEC 3000, or MMT, at a concentration of
21 1/32 gram per gallon.

22 Several of the MVMA member companies have
23 indicated that they will submit written comments after
24 the hearing. Also with me today are Marvin Jackson from
25 General Motors, Gordon Allardyce from Chrysler, and Ron

1 Hurley and Tom Lasley from Ford Motor Company.

2 I will highlight key elements of the testimony;
3 the full text has been submitted for the record.

4 We are here today primarily to share and
5 discuss with EPA one of our member companies,
6 specifically Ford's, test data collected to evaluate the
7 effect of MMT on exhaust emissions, emission control
8 devices, and emission devices themselves.

9 The basic vehicle mileage accumulation in
10 testing for exhaust emissions has been essentially
11 completed. Briefly stated, the Ford test program
12 consists of eight vehicles accumulating 100,000 miles
13 each. Four accumulated mileage with MMT and four without
14 at the requested concentration.

15 The four 1991 Escort vehicles had production
16 emission control calibrations whereas the four Explorer
17 vehicles were calibrated to meet 1993 California or 1994
18 federal hydrocarbon standards of .40 grams per mile at
19 100,000 miles.

20 The results are summarized in the attachments
21 for this testimony. It should be noted that all HC data
22 shown in the attached charts are total HC. All vehicles
23 had a 5,000 mile break-in with certification mileage
24 accumulation fuel prior to emission testing and use of
25 the additive.

1 Emission testing was conducted over the 100,000
2 mile driving interval with and without exposure to MMT
3 starting at 5,000 and ending at 105,000 miles. An
4 evaluation of selected emission control devices and
5 systems after mileage accumulation is in process. A
6 detailed description of the Ford test program with the
7 test results through the first 50,000 miles has already
8 been made available to EPA on September 4, 1991. An
9 overall program report through 100,000 miles will be
10 forthcoming.

11 The results of the Ford test program through
12 100,000 miles demonstrated statistically significant
13 increases in tailpipe and feedgas hydrocarbon emissions.
14 These results are attached. The overall deterioration in
15 emission performance greatly increases over the remaining
16 50,000 miles of testing greater than that shown in the
17 first 50,000 miles.

18 The tailpipe hydrocarbon emission level over
19 100,000 miles was 200 to 300 percent greater with MMT
20 exposure as compared to vehicles without MMT. In other
21 words, MMT caused a two to threefold increase in
22 hydrocarbon emission levels. There is little effect of
23 MMT on CO emissions. There is a clear increase in NO_x
24 emissions, although that emission effect changes between
25 50,000 and 100,000 miles.

1 Based upon previous experience, some of the
2 member companies have speculated in prior submissions
3 that the increase in hydrocarbon levels is believed to be
4 the result of four basic factors -- Mn_3O_4 deposits in the
5 combustion chamber creating crevices which serve as
6 hiding spots for air fuel mixtures which pass through the
7 chamber unburned; oxygen sensors coated with Mn_3O_4 ;
8 changing the engine air/fuel mixture from that intended
9 by engine design; deposits on the fuel injectors altering
10 the spray patterns and/or preventing closure, thus
11 increasing enrichment in one or more cylinders; and
12 lastly, Mn_3O_4 on the catalyst wash coat leading both to
13 increased back pressure which will increase residual gas
14 in the engine and to loss of converter efficiency.

15 The testing results to date seem to be
16 consistent with this speculation.

17 Although the Ford fleet accumulated more than
18 800,000 miles in total, that amount is less than Ethyl's
19 3 million miles. MVMA believes that these Ford data are
20 more representative of the effects of MMT under real life
21 conditions. This is based on several factors.

22 First, based on Ford's use of a mileage
23 accumulation fuel that is consistent with certification
24 procedures, meaning it contains a commercially available
25 detergent additive. Next, based on the use of driving

1 schedules representative of actual customer usage; based
2 on a break-in period for all vehicles to stabilize in
3 effectively paired vehicles before introduction of the
4 additive; certification and representative emission
5 control device and system maintenance; the inclusion of
6 all test data; conducting a greater number of emission
7 tests -- six in comparison to the applicant's two or
8 three -- at each interval; resulting in increased
9 statistical significance overall; and finally, a 33
10 percent greater mileage accumulation in test interval for
11 each vehicle, 100,000 miles versus 75,000 miles of
12 exposure.

13 MVMA remains troubled by a lack of post-program
14 evaluation of the functional characteristics of some of
15 the emission control devices or systems to corroborate
16 statistical conclusions made in the application. It is
17 good engineering practice to individually inspect and
18 test components from which conclusions and decisions are
19 drawn after durability test programs.

20 It is evident that a finding that the MMT
21 additive will not impair to a significant degree the
22 performance of any emission control device or system as
23 defined under Section 211(c)(1)(B) of the Clean Air Act
24 cannot be made unless some of the individual components
25 are functionally checked.

1 Even though Ethyl's test vehicles could pass an
2 emission test, some of the emission control components
3 may be significantly impaired or operating outside their
4 performance limits. Ethyl's claim that the total
5 emissions -- HC, CO, and NO_x -- from the test fleet are
6 not adversely affected by MMT does not provide a valid
7 basis to support an EPA determination that the emission
8 control devices and systems are not significantly
9 impaired -- this particularly considering the contrary
10 findings in data submitted previously on the additive.

11 As some MVMA member companies have previously
12 indicated, there are concerns with the Ethyl test
13 protocol. These concerns are essentially as follows and
14 not necessarily in rank order: Ethyl's use of a
15 subjective decision process as to the number of tests
16 performed at some test intervals creating a lesser
17 statistical significance overall with the test data; a
18 subjective decision as to the inclusion of some test
19 data; replacement of fuel injectors not allowed under the
20 EPA certification regulations; and the use of a mileage
21 accumulation fuel which is not representative of
22 commercially-available fuel as required under the EPA
23 certification protocol.

24 As such, MVMA believes that the data and
25 conclusions submitted by Ethyl in support of its waiver

1 application are flawed. A summary of additional MVMA
2 observations and questions is also attached.

3 In conclusion, MVMA believes that the Ford test
4 protocol and data more accurately represent the effect
5 MMT will have on emission performance in actual customer
6 usage than those provided in the application. Ford's
7 data clearly indicate that MMT significantly impairs the
8 performance of emission control devices or systems
9 because it causes and contributes to an HC emission non-
10 compliance condition for the trucks and a significant HC
11 increase for the passenger cars.

12 It is respectfully submitted that Ethyl has
13 failed to provide EPA with data that would enable the
14 agency to make the required determination necessary to
15 approve the application. As such, EPA must deny Ethyl's
16 waiver request.

17 I'd be happy to answer any questions.

18 MR. WILSON: Thank you very much for your
19 testimony.

20 Why do you think you saw on your cars a
21 hydrocarbon increase in carbon monoxide?

22 MR. KULP: It's not clear to us yet and
23 probably until the post mortem is done as to exactly why
24 that occurred. Ron, have you any suggestions as to why
25 this was encountered because some of our catalyst bench

1 testing has indicated deterioration in the conversion
2 efficiency of both HC and CO. I think part of it is that
3 we cannot statistically ascertain the difference on CO in
4 part because the CO seems to be a bit more variable.

5 MR. HURLEY: I think that's exactly correct.
6 We just have not had time to do the post mortem analysis
7 yet on the catalyst. Before we do that, we simply cannot
8 ascertain why or give a direct explanation as to why this
9 occurred.

10 MR. WILSON: So you plan on evaluating the
11 various control system components from these vehicles and
12 providing that to us as part of the record?

13 MR. HURLEY: That's correct.

14 MR. WILSON: What's your timing on that?

15 MR. KULP: It's not clear to us that we will
16 have the testing done by October 4th. We are moving as
17 quickly as we can to get them all completed. There are
18 some complications internally in terms of access to these
19 vehicles, at least the Explorer vehicles, because they
20 were also needed for other programs. These were shared
21 durability vehicles doing some additional testing for
22 other people.

23 I would expect that we should be able to
24 complete much of the testing within a month.

25 MR. WILSON: Is that concluding the component

1 checking or is that just --

2 MR. KULP: That is the component checking. The
3 only thing that's remaining in the vehicle testing is the
4 testing on the 318 Escort and that's in process right
5 now. That's one of the MMT vehicles.

6 MR. WILSON: When you compared your data to the
7 Ethyl data what do you think is the key reason why you
8 saw different emission results than they saw?

9 MR. KULP: That's somewhat difficult to say, in
10 part because when we reviewed the Ethyl test data, we had
11 to recognize that the lack of detergent additive in the
12 fuel has already given us a baseline that is questionable
13 for comparison of the MMT effects and it's not clear to
14 us exactly how the effect or the lack of additives and
15 the build up of other deposits in other locations may
16 have altered the baseline.

17 In addition, the selection --

18 MR. WILSON: How do you think the additives
19 would affect --

20 MR. KULP: Normally, the detergent additives
21 are put in fuels specifically -- in fact, Ford made a
22 very lengthy and sincere effort to contact a large number
23 of the oil companies in the early to mid-1980s because we
24 were running into difficulties with injector fouling in
25 vehicles in the field. We felt that consistent use of

1 detergents for injector clean-up was essential,
2 particularly with the growing use of fuel injector
3 vehicles.

4 In addition, there are other detergents used
5 for keep cleaning, either in the area of valve stems and
6 valve guides and other areas. Thus, the build-up of
7 deposits in the areas -- either in the combustion chamber
8 or in the injectors or on the valves themselves -- will
9 tend to increase emissions. In fact, this is one of the
10 characteristic tests that's used to determine the
11 effectiveness of an additive.

12 MR. WILSON: I'm confused though. I think your
13 testing had the detergent additive and Ethyl's didn't.

14 MR. KULP: Your question to me was, as I
15 understand it, why did our tests show up something that
16 was seen in the Ethyl data. My answer is --

17 MR. WILSON: I'm trying to understand the
18 effect. If I understand correctly, you had detergent
19 additive in your test vehicles and Ethyl did not.

20 MR. KULP: And therefore, we believe the
21 baseline vehicle, the non-MMT vehicle, then showed us a
22 representative baseline from which to compare the effect
23 of MMT.

24 MR. WILSON: You think your vehicle had lower
25 hydrocarbon emissions than had it been operating on fuel

1 without a detergent additive?

2 MR. KULP: Correct. If we add to that the
3 complication of the injector replacements in the majority
4 of the Ethyl vehicles, somewhere between 30,000 and
5 50,000 miles, we think that may have altered their
6 deterioration factor. We did not replace injectors in
7 the course of our evaluation.

8 MR. WILSON: Oh, I see.

9 MR. KULP: Some of the deterioration factors in
10 the Ethyl program appeared to begin to move up towards
11 50,000 miles and post-injector replacement tend to move
12 back then.

13 MR. WILSON: But if you're correct, I'm just
14 trying to understand, it sounds like not having a
15 detergent additive in the test fuel would tend to provide
16 higher hydrocarbon emissions and therefore a higher level
17 in the Ethyl test program than in your test program.
18 What am I missing?

19 MR. KULP: The difficulty is that there are
20 three key areas that we had raised, concern areas with
21 the Ethyl test program. We feel that all of these
22 combine together to mask the effect of MMT because it
23 introduces variability into their test program that we
24 feel was not in effect in our test program.

25 The reason we ran six tests was to insure

1 statistically significant indications of the emission
2 levels at the particular mileage points that we tested as
3 opposed to the Ethyl program which may run two or three
4 tests or some additional tests, and only in the first two
5 tests, first two valid tests at each interval, appeared
6 to have been used in the deterioration factor
7 determination.

8 In addition, they averaged all the vehicles
9 together to generate the deterioration factor or rather a
10 connection with the test points.

11 We think all these factors tend to allow for a
12 masking of the true effects of MMT. In addition, all of
13 our bench testing to date on catalytic converters exposed
14 to MMT either in vehicles, in the Canadian programs that
15 we have run, removal of catalysts from Canadian vehicles
16 that have been in actual customer operation, all indicate
17 the same thing, a loss of catalyst efficiency with
18 mileage and it's mileage-related because the filtration
19 process in the converter tends to grow.

20 So if all of our bench testing and all of our
21 scientific data is telling us something, then our test
22 program was set up to try to be a fair evaluation of the
23 two, and it's showing us the same thing, I find myself in
24 a difficult position of trying to explain why our program
25 is showing what science and engineering say is probably

1 the case and the Ethyl program does not show that except
2 to point to these particular questionable areas in their
3 program.

4 MR. WILSON: Were there differences in the
5 control technology on the vehicles that you tested versus
6 what Ethyl tested?

7 MR. KULP: Ours were 1991 level or 1993 level
8 vehicles, so there is a different calibration on the
9 vehicles. I think there are also differences in the
10 control strategies. I have to go back and look
11 specifically at the Ethyl vehicles to do a line by line
12 comparison but clearly there are different calibrations,
13 and in some cases, they use different control systems.

14 MR. WILSON: What is your evaluation of the
15 significance of the hydrocarbon increase you saw in terms
16 of the ability for vehicles to meet emissions standards?

17 MR. KULP: I believe that the increase that was
18 shown in the Ethyl data indicated it was about 6 percent,
19 if I'm not mistaken. The increase that we're seeing is
20 much larger than that. In fact, the increase in
21 hydrocarbon emissions on several of the vehicles appeared
22 to increase -- I'm sorry, appeared to exceed the total
23 level of the standard that we will be facing for 1994.
24 In the case of the Explorers, we did observe some line
25 crossing that is exceedence of the applicable standard

1 and the increase on the Escorts was fairly substantial,
2 hence, statistically significant.

3 The differences that we're looking at are on
4 the order of about .10 gram per mile of hydrocarbon,
5 which also consistent with a loss of about 10 percent or
6 so in catalyst efficiency.

7 MS. SMITH: You indicated in your testimony
8 that part of the reason for the HC increase is increased
9 back pressure. However in Ethyl's test data, they
10 indicate they don't see any significant difference in
11 back pressure between the clear fuel vehicle and the MMT
12 vehicles.

13 MR. KULP: I'm not sure that the testing that
14 was run post-program on the Ethyl vehicles would have
15 discriminated the kinds of differences that would provide
16 these increases in hydrocarbon emissions. I was aware of
17 a series of tests that were run on some Corvettes that we
18 were shown more recently that indicates about a .7 inch
19 of mercury increase in back pressure in relatively short
20 period of time.

21 If you extrapolate that data out to 100,000
22 miles, it would indicate that there would be inches of
23 mercury changed in backpressure. In addition, I'm not
24 sure that the cycle that was run may have provided for a
25 worse case rate or more typical rate of precipitation of

1 trimanganesetetraoxide (ph) on the surface of the
2 catalyst primarily because it was running at a fairly
3 high speed.

4 I think it takes a combination really high
5 temperatures in the exhaust system, high fuel flow, but
6 relatively slower speeds such as those that would typify
7 cold start and driveaway type of operation. So I'm not
8 sure that they have the worse case level of build-up but
9 they do indicate at least a more substantial increase in
10 backpressure than did their first evaluation team.

11 MS. SMITH: You indicated that driving cycles, a
12 difference in driving cycles between Ford's program and
13 Ethyl's program would yield also a difference in
14 hydrocarbons. What is it with driving cycle you think is
15 so different that would lead to a delta?

16 MR. KULP: I believe -- part of this is
17 difficult to quantify unless we go out in instrument
18 vehicles and actually run through both cycles. It would
19 appear that our program probably was a bit more severe in
20 terms of the mileage accumulation and the speeds and
21 temperatures and acceleration. We also allowed for
22 enough stops and starts and low speed operation that I
23 think we would have gotten more typical build-up on the
24 catalytic converters.

25 MS. SMITH: You used some prototype vehicles in

1 the Explorers. Would you expect to see a difference
2 between the prototypes in production vehicles?

3 MR. KULP: First of all, let me clarify the
4 word prototype. We used that and maybe we shouldn't
5 have. We had production level vehicles that had one
6 prototype aspect of their operation and that was with
7 regard to the operation of the thermactor (ph) system.
8 That was a system that was being looked at for
9 applicability to 1993 or 1994.

10 The balance of the operation of the control
11 system and strategy, the fuel supply and its rate of
12 change with changing requirements, spark timing and so
13 forth were all consistent throughout the tests and
14 consistent with current production. So they were only
15 prototype with respect to how they cycled with
16 thermactor.

17 In that regard, I would believe that these
18 vehicles should show very typical emission levels and
19 should show very typical build-up of what would occur in
20 the field.

21 MS. SMITH: Since you're probably familiar with
22 what kind of technology is going to be needed for future
23 standards in the 1994, 1995, 1996 time frame, what do you
24 think the effect, given those changes in technology that
25 MMT would have on future standards and how much your

1 program either say something or not say something about
2 that?

3 MR. KULP: All of the changes that we must
4 make, save a very few, are probably going be in the
5 direction of aggravating the rate of deposition of
6 manganese, trimanganese tetroxide (ph) or the formation.
7 If our contention is correct, that it requires relatively
8 high temperatures, somewhat high fuel flow in certain
9 situations such as cold starts, which is really a field
10 conditions, so high temperatures, typifies the things
11 that we will have to do to meet the new standards -- that
12 is, movement of catalytic converters much closer to the
13 engine in order to assure fast light off or the use of
14 electrically-heated catalysts or other types of systems
15 that allow for fast light-off of the catalytic
16 converters.

17 It is that very fast light-off that we need
18 that will also be adversely affected by the deposition of
19 manganese because our bench data in other tests which we
20 submitted based on the prior waiver application show the
21 deleterious effect on light-off temperatures with
22 increasing miles and exposure to MMT.

23 MS. SMITH: On CO, we see it 50,000, actually a
24 decrease in carbon monoxide emissions overall, in fact,
25 larger than Ethyl's data increase, but then we see a

1 little bit different kind of reaction. Do you have an
2 explanation as to why?

3 MR. KULP: I think we'll have to reserve
4 judgment for that. What we attempted to do was make sure
5 that Ethyl, EPA and others had access to this data as
6 soon as it was complete. Since we had no control over
7 the timing of the application or the hearing, we weren't
8 finished but we wanted to get the data on the street, so
9 I'll have to reserve judgment on that until we've
10 completed post-mortem testing.

11 MR. EDWARDS: What kind of confidence do you
12 have in the Ford data given that the sample size is so
13 much smaller, for example, than Ethyl's size?

14 MR. KULP: I think -- first of all, when we do
15 a certification program, quite often -- vehicle that
16 completes and three or four 4,000 mile vehicles that are
17 tested, so we certainly exceed the requirements of the
18 basic certification program.

19 In terms of the testing itself, I think our
20 greater number of tests would provide much greater
21 statistical significance of the effects of MMT and our
22 use of all available data that we run and each mileage
23 would increase the statistical significance of the
24 program.

25 So I believe we have a better indicator here

1 and coupled with the question of the base fuel, the
2 referenced fuel, I think further indicates our program
3 should be more reliable in making the determination
4 rather than that run by Ethyl.

5 MR. WILSON: If I could just follow up for a
6 second. Is there anything unique about these two vehicle
7 types that you tested that would tend to make them worst
8 case characteristics vis a vis the effects MMT may have?

9 MR. KULP: I wouldn't say that they were both
10 worst case. With respect to the mounting of the
11 catalysts, yes, they may be somewhat of a worst case, but
12 not with respect to what we may have to do to meet 1994
13 federal emission levels.

14 In terms of the Escort, it is not what you
15 would call a high fuel flow rate vehicle. We don't sell
16 it based on that, so we certainly hope it isn't received
17 as such. So it wouldn't qualify in that regard.

18 But in terms of the close mounting of the
19 catalyst, yes, it would tend to typify that type of
20 situation. If we had the luxury -- and we didn't in the
21 course of this program; we sort of had to look to some
22 available vehicles that could be tested for our program -
23 - we would have picked vehicles differently, looking for
24 vehicles that have higher fuel flow rates, more typical
25 of an average car in the U.S. and also having the close-

1 mounted catalytic control system.

2 MR. WILSON: Has anybody else in the auto
3 industry run similar tests or are they planning to?

4 MR. KULP: There are some tests that may be
5 underway but not to this level of detail and not to run
6 necessarily initial tests. I'm aware of some others.
7 I'd rather let Chrysler and GM speak for themselves if
8 they have any testing running. I'm unaware of anything
9 being done by the Japanese manufacturers but they are not
10 here.

11 MR. JACKSON: I'm Marvin Jackson from General
12 Motors.

13 We have run some tests commonly called rapid
14 aging tests run by AC Rochester. The test is a 100-hour
15 test and runs on a cycle that is designed to a catalyst.
16 The catalyst will run with and without MMT in the fuel.
17 The catalysts that were run were Corvette catalysts,
18 close-coupled catalysts, and in the 100 hour test we saw
19 really no statistical difference in the efficiency across
20 the catalysts with and without MMT. In other words, we
21 did not see any catalyst enhancement as claimed by Ethyl
22 Corporation.

23 We have not run any mileage accumulation tests
24 on the road.

25 MR. WILSON: Nor, I gather, any catalyst

1 deterioration as suggested by the Ford data?

2 MR. JACKSON: We have not run tests like Ford.

3 MR. WILSON: I guess it will be interesting as
4 you do your catalyst evaluation to make an assessment of
5 whether your catalyst seem to be performing differently
6 than the catalyst that GM did.

7 MR. ALLARDYCE: Chrysler has a comment. I'm
8 Gordon Allardyce with Chrysler.

9 I just wanted to respond to your question on
10 that. Chrysler has not done any testing with MMT. We do
11 have, as all the other manufacturers, results from
12 vehicles actually in the field, for instance in Canada,
13 that have been run on fuel containing MMT. Of course
14 even though officially that's 1/16, a lot of the fuel out
15 there actually comes in closer to 1/32 gram MMT.

16 The other thing I wanted to call to your
17 attention, we submitted this earlier back in 1990 when
18 this matter was before you and we will submit it again
19 for the record. The CRC testing that was done back in
20 1979. At that time, it was a 63-vehicle test program and
21 some of the results of that are similar to Ford.

22 For instance, you asked a question earlier
23 about the hydrocarbon increases but carbon monoxide
24 doesn't. For whatever reason, the same thing showed up
25 in the CRC study of over 10 years ago, so perhaps there

1 is something unique about the MMT additive that nobody
2 understands that causes that kind of an increase. I just
3 wanted to comment that was in fact done, the same results
4 found in the past.

5 As far as couple of the other comments, let me
6 just make some brief comments on that. That has to do
7 with the driving schedule. Ford used what is actually a
8 more severe schedule, which we believe is certainly more
9 realistic. We encounter a broad range of conditions out
10 there in the field, of course, with the vehicles not just
11 those kind of conditions that were used in the test by
12 Ethyl.

13 Of course it is the auto companies who are at
14 risk and ultimately the environment if whatever
15 conditions vehicles are subjected to cause hydrocarbons
16 to increase, the auto companies, through the threat of
17 recall and the environment through the lack of
18 improvement that is engineered in the new cars.

19 Just one additional comment. There was a
20 question just recently about the increased statistical
21 significance and the effects on future technology. It
22 should be noted -- we will for the record officially
23 before it closes -- that the standards are getting
24 tighter all the time, not just in California but
25 federally as well, so that any small differences in

1 hydrocarbon increase, even though a few years ago with
2 the older standards, perhaps could have been tolerated by
3 the vehicles, will be much, much more difficult to
4 compensate for in the future.

5 MR. BABCOCK: I'm Bob Babcock from Toyota.

6 In response to your question, we had no plans
7 to make a presentation this morning but to respond to
8 your question, we have some written comments that we will
9 be submitting.

10 Toyota has found in limited testing that we've
11 done that hydrocarbon emissions show a significant
12 increase and catalyst conversion efficiencies decrease,
13 particularly between 300 and 400 degree Centigrade.

14 We are also concerned, as MVMA is, regarding
15 catalyst deposits. We see an increase in catalyst
16 deposits by quite a large percentage and also on oxygen
17 sensor deposits as well.

18 We'd like to state that we support at this
19 time, MVMA's comments and we will be submitting our
20 details of our testing in our written comments.

21 MR. KULP: In regard to the question that
22 initiated this discussion, I want to say first of all, we
23 really appreciate the effort that Ethyl has made to keep
24 us informed of their test program. Despite the fact that
25 we have technical disagreements on the outcome and on the

1 conclusions, they have made a specific effort to keep us
2 involved in the process.

3 However, we do find ourselves with a unique
4 position. The burden of proof is not on us in this
5 waiver application and we found ourselves rather than
6 drawing on existing data that was submitted in support of
7 prior waiver applications or in CRC test programs, or
8 other programs, evidence that we think very clearly
9 indicates a potential problem, we found ourselves really
10 with no choice but to have to run this additional
11 testing.

12 I think it is very difficult for the
13 manufacturers given the number of burdens we have
14 affecting us a result of the Clean Air Act passage,
15 primarily, that are coming up, we are overwhelmed with
16 things to do. Taking time to run this additional test
17 program to evaluate an additive -- we've normally never
18 done any testing specifically of additives where there's
19 been an application for waiver and only very limited
20 testing of oxygenates when they were in for waiver
21 applications.

22 So we find ourselves in a very odd position
23 here of having to run things to provide the burden of
24 proof that this will cause an effect that is consistent
25 with prior engineering information.

1 MR. ATKINSON: One question. Would you
2 elaborate on what you have in mind for the post-mortem
3 analysis and what type of priority you assigned to the
4 various types of analyses?

5 MR. KULP: What we would like to do is if time
6 permits -- again, some of this is being controlled by the
7 availability of the vehicles and the timing on this
8 waiver decision -- we would like to be able to
9 interchange exhaust gas sensors and catalytic converters
10 and then we would like to do some teardown of the
11 catalytic converters for evaluation of the converters for
12 efficiency, BET, and look for what metals are deposited.

13 We have gotten as far as taking photographs of
14 some of these, but obviously we don't want to do anything
15 that will disturb the deposits or lower them. So we're
16 trying to do the destructive testing last.

17 MR. ATKINSON: I guess I would encourage you --
18 essentially the comment period closes on the 4th -- as
19 the most important pieces of that become available, put
20 that in the docket as soon as you can.

21 MR. KULP: We were discussing the conflicting
22 problems we have here between available funds,
23 availability of the vehicles and timing of the closure of
24 the docket, but we're going to do our best.

25 MR. LAWRENCE: I have a couple of questions on

1 your testimony and also on the earlier submission we got
2 a couple of weeks ago.

3 You said you saw a catalyst efficiency loss in
4 the Canadian vehicles. My question is, how does that
5 compare to with or without MMT? Do you see still
6 percentage loss of efficiency on either Canadian or
7 comparable technology in domestic vehicles at the same
8 mileage?

9 MR. KULP: No, we have not seen comparable
10 losses typically. As you recall, we had run two
11 programs. The first was on about 44 catalysts that were
12 returned for reasons of warranty problems, emissions-
13 related warranty in Canada. There was some concern
14 raised about the validity of that evaluation so then we
15 switched to doing a voluntary program with our employees
16 in Canada and asking them to bring their vehicles in and
17 removing those catalysts.

18 The results of the post-mortem evaluation
19 catalytic converters would indicate a direct relationship
20 between the miles of exposure to MMT, the amount of MMT
21 on the catalyst and the loss of efficiency.

22 MR. LAWRENCE: You're going to submit that data?

23 MR. KULP: Yes.

24 MR. LAWRENCE: Earlier you mentioned, just to
25 clarify, you said exhaust backpressure increase of

1 several inches of mercury?

2 MR. KULP: Only if you extrapolate the data
3 that we had seen at the seven, that showed the Corvette
4 data that had been shown, if you extrapolate that.
5 There's obvious problems with extrapolating data linearly
6 but since the mileage stopped well short of the 100,000
7 required mileage -- in fact, as you know, light duty
8 trucks now have 120,000 durability requirement, so the
9 100,000 mile requirement is not unreasonable given the
10 truck requirement and the pending 1994 requirement.

11 MR. ATKINSON: The question is, there's an
12 increase in mercury, you meant to say?

13 MR. KULP: I'm sorry, inches of mercury was
14 what I had said, was wide open throttle and not a ratio.

15 MR. ATKINSON: I see. In your vehicle
16 description of August 2, and as you testified today,
17 there is differences. The Explorer is a 1993 prototype
18 vehicle. Is the catalyst on that vehicle also a 1992
19 prototype? I notice it's a different ratio loading than
20 the Escort was?

21 MR. KULP: I'd turn to Ron to answer that
22 question but Ron just shook his head.

23 MR. ATKINSON: You show a ratio of platinum of
24 rodium of 5:1 on the Explorers.

25 MR. HURLEY: The catalyst on the Explorer are

1 production Explorer catalysts. Those on the Escort are
2 production Escort catalysts. Those are standard 1991
3 production vehicle catalysts.

4 MR. ATKINSON: Did your report include all of
5 your data or did you screen or delete or exclude any data
6 at all that you took from the summary?

7 MR. KULP: We did not exclude any of the data
8 that was run on these vehicles. Was there something
9 specific you're requesting?

10 MR. ATKINSON: No. You had made that comment
11 that Ethyl seems to have screened some of their data and
12 I was checking yours.

13 MR. KULP: Yes. Our selection criteria -- our
14 statisticians were very insistent. We had looked to a
15 progression process to see if we could run three tests
16 and decide how close they were and then run a fourth and
17 fifth. They were insistent it was necessary to run all
18 six tests to discriminate the kind of differences we were
19 looking for here.

20 MR. ATKINSON: The last question I have just to
21 clarify. In that earlier report, there are several
22 tables that show MMT effect on HC by vehicle pairs. It's
23 not obvious to me but I'm questioning, is that grams per
24 mile number in those tables?

25 MR. KULP: Which table are you speaking of?

1 MR. ATKINSON: That Hurley paper that you gave
2 us dated August 2.

3 MR. KULP: What's the table number you're
4 looking at?

5 MR. ATKINSON: Tables 5, 6, and 7.

6 MR. KULP: Ron, I'll have to turn to you
7 because there not --

8 MR. ATKINSON: You can provide that later if
9 you like.

10 MR. HURLEY: That's grams per mile.

11 MR. ATKINSON: Thank you.

12 MR. KULP: We can add that amendment to the
13 record. We probably omitted it on the table
14 inadvertently.

15 MR. WILSON: Thank you very much for your
16 testimony this morning.

17 Our next witness will be Mr. Dewey Mark.

18 STATEMENT OF DEWEY MARK

19 MR. MARK: I filed a written statement for the
20 record and in the interest of time, I will not read it.
21 I have a very few brief comments to make.

22 First of all, I appeared before you last year
23 on the initial application waiver filed by Ethyl. I'd
24 like to make it clear that I spent almost 40 years in
25 this business. I'm immediate past President of Diamond

1 Shamrock and immediate past President of the NPRA. I'm
2 not appearing here on behalf of any company or any group
3 but just as an individual with a great continuing
4 interest in the refining business.

5 When I was here last year about this time, I
6 chose to stress to you what I thought was the most
7 valuable aspect of MMT, and that was the fact that it is
8 a very inexpensive octane improver to the refiner. At
9 that time, we did not know what the Clean Air Act was
10 going to look like and we certainly had not had the
11 privilege of going through the "Reg Neg" process.

12 I still believe that it's important, especially
13 to the smaller, independent refiners to have access to
14 MMT primarily as an octane trimmer. I think this
15 condition also important to the major oil companies.

16 When you blend gasoline, frequently you get
17 down to the very end and you need an extra half or an
18 extra number and the availability of MMT provides that
19 flexibility, and flexibility is the key word to a
20 refiner.

21 Having sat through most of the "Reg Neg"
22 process, having heard with great interest the position
23 that many advocates have taken, including EPA, as it
24 relates to the statute, the details that there shall be
25 no NO_x increase for 1990 baseline gasoline. I feel that

1 perhaps the singlemost important aspect of MMT is the
2 data that has been generated indicating that at 1/32 gram
3 you can accomplish an average of about 20 percent
4 reduction of NO_x.

5 I believe very strongly that MMT is just one
6 more arrow in the quiver of a refinery to accomplish the
7 desire of the EPA as well as the statute, to comply with
8 the requirement of no NO_x increase.

9 With that, I'll conclude my remarks by urging
10 that the EPA grant and approve the Ethyl application.

11 Thank you.

12 MR. WILSON: Thank you very much for your
13 testimony. Do you have any comment on the auto industry
14 testimony on hydrocarbon levels?

15 MR. MARK: I've not had an opportunity to see
16 the data and study it in detail, but I'm sure that once
17 that data is made available in its entirety, that there
18 will be adequate critique available to your agency.

19 MR. WILSON: Thank you very much. We
20 appreciate your being here today and working through the
21 "Reg Neg" process with you.

22 MR. MARK: That was an experience of a
23 lifetime.

24 MR. WILSON: The next witness is Dr. Albert
25 Kolbye of Chemetals.

1 STATEMENT OF DR. ALBERT KOLBYE

2 ON BEHALF OF CHEMETALS, INC.

3 DR. KOLBYE: Good morning, ladies and gentlemen.

4 I will read my statement since I don't have
5 extra copies and I think the audience might appreciate
6 this viewpoint.

7 My name is Albert Kolbye, Jr. and I speak with
8 the training and experience of well over 30-years in
9 biomedical and environmental health matter. I served 20
10 years in the United States Public Health Service
11 Commission Corps dealing mainly with problems of chemical
12 safety, 13 of which were with the U.S. Food and Drug
13 Administration as a principal health advisor and manager
14 with regard to environmental chemicals in all relevant
15 modes of human exposure.

16 For 11 years, I held the rank of Rear Admiral
17 as an Assistant Surgeon General. I'm a physician also
18 trained in public health and epidemiology and I practiced
19 environmental toxicology and risk evaluation for at least
20 25 years. I'm also a lawyer.

21 My role here is as an advisor to share with you
22 what I know and what I see. I am retained by Chemetals,
23 Inc. of Baltimore, Maryland for my professional time, but
24 not for advocating anything I do not believe.

25 My curriculum vitae is attached to your copies

1 of my prepared testimony.

2 I have at least 20 years experience in
3 evaluating the potential risks to human health that might
4 be associated with ingested, inhaled, injected and
5 topically-applied chemical substances. These have
6 included environmentally-occurring compounds and those to
7 which humans are exposed in occupational settings or in
8 the practice of the medicinal sciences.

9 My experience also includes being a responsible
10 decisionmaker in our efforts to prevent cadmium, lead and
11 mercury poisoning which included extensive personal
12 involvement in international approaches to these and many
13 other problems.

14 I've been extensively involved in evaluating
15 any potential public health risks of exposure to
16 manganese compounds that might reasonably be expected to
17 occur as a result of permitting the use of MMT as an
18 additive to gasoline used in automobiles. I reviewed all
19 relevant documents of which I am aware. I have a
20 footnote -- let me interrupt myself. I would like to
21 request a list of the documents that his panel is
22 considering if that is obtainable well before the
23 deadline of October 4. It would save you time and save
24 us time in organizing which documents you have before
25 you.

1 I'm here today to say that I see no public
2 health problems that can reasonably be expected to occur
3 if usage of MMT is approved. I am speaking with regard
4 to the manganese component. There really is no
5 substantive scientific issues simply because the
6 anticipated human exposure to manganese are so very
7 small. There is no reason to expect or suspect problems
8 with adults, children, pregnant women or their fetuses in
9 relation to anticipated exposures to manganese related to
10 the usage of MMT.

11 The expected manganese exposures from residues
12 in air due to the use of MMT in gasoline would
13 approximate an increase in the background levels of
14 roughly 0.03 micrograms per cubic meter of air to about
15 0.05, may 0.06 micrograms per cubic meter.

16 I think it's fair to assume a total of about
17 0.05 micrograms per cubic meter of air for the purpose of
18 making some calculations about potential risks. These
19 exposure levels are at least 20,000 times less than those
20 which have occurred at milligram levels per cubic meter
21 or higher that have been associated with manganese
22 induced diseases in occupational settings which involve
23 extensive time periods and intensive exposures. There is
24 an extremely wide margin of safety involved here.

25 A safety factor of 10 is very powerful if

1 applied to a no adverse effect level traditionally used
2 in preventive toxicology for human data. Even more
3 conservative is an additional tenfold safety factor if
4 only animal data are available. Thus, only 1 percent of
5 a no observed adverse effect level, called a NOAEL, in
6 animals would be permitted for humans if an intentional
7 food additive was involved.

8 For many essential nutrients, such as Vitamin
9 A, not even a tenfold safety factor can apply because
10 within that range, too little causes disease and too much
11 causes disease.

12 In the entire history of epidemiology and
13 toxicology to protect people from exposures to chemical
14 substances, no problems have arisen from using this
15 approach to protecting public health provided that
16 reasonably accurate estimates of anticipated human
17 exposure are available. For known or suspected complete
18 carcinogens or potent teratogens, additional safety
19 factors have been used but are not relevant to the
20 manganese situation.

21 Manganese is an essential and important
22 micronutrient required for normal function of many
23 enzymes in the mammalian body which includes us humans.
24 Deficiency states are unlikely due to the ubiquitous
25 dietary presence of substantial amounts of manganese but

1 it should be remembered that less than desirable intakes
2 may induce toxicity due to biological impairment from
3 insufficient intake amounts. Below a certain intake,
4 toxicity induced by deficiency of a required nutrient
5 will occur.

6 By implication, therefore, a wide margin of
7 biological safety exists for manganese. Comparisons of
8 lead toxicity to manganese biology are not appropriate to
9 these proceedings since lead is not an essential nutrient
10 and insofar as we know today is toxic per se, although
11 the body has many effective biological defenses up to
12 certain levels of exposure to lead.

13 Only occupational inhalation exposures to
14 humans in the range of milligrams per cubic meter of air
15 sustained over many years have been associated with
16 manganese toxicity.

17 The many animal toxicity studies referred to at
18 the March 1991 meeting in Research Triangle Park, North
19 Carolina and elsewhere usually involved injections --
20 either by intravenous or subcutaneous routes of
21 relatively massive amounts of manganese in
22 milligram/kilogram of body weight -- which are not
23 relevant to low level inhalation considerations.

24 Such studies are not safety studies. They were
25 designed to create toxicity in order to study biological

1 end points of interest and mechanisms by which biological
2 damage might be induced. Such studies must be considered
3 in the context of the high dosage patterns employed by
4 the researchers.

5 Epidemiological considerations concerning the
6 information so far submitted to EPA do not suggest
7 further need for large scale studies. Data exists which
8 could receive further review to specify certain details
9 but there are new data to indicate trouble to be expected
10 from usage of MMT with reference to manganese.

11 In fact, usage of MMT in Canada at higher
12 levels than proposed for the U.S. today have not been
13 associated with any problems. Micro-environments, such
14 as parking garages and street canyons, can be monitored
15 where needed to assure that inhalation exposures in such
16 settings are not excessive.

17 Children are not expected to have any problems
18 from these airborne exposures, nor would pregnant women
19 and their fetuses. These findings are evident from EPA's
20 report of the conference in March 1991 at Research
21 Triangle Park in North Carolina.

22 For whatever reasons that underlie the safety
23 factors that were applied by EPA to the estimated RfC,
24 their total sum, in my opinion, is not justified by
25 factual science or by our experience in public health.

1 There is no substance known to humankind which requires
2 more than 1000-fold safety margin with reference to the
3 lowest NOAEL as determined from relevant data in order to
4 assure no significant risk to public health. This
5 includes aflatoxin and 2,3,7,8 Tetrachlorinated Dibenzo
6 Dioxin, otherwise known as TCDD.

7 While safety margins approximating 5,000 have
8 been used for certain carcinogens, these considerations
9 again do not apply to manganese in any way I know of.
10 Once can assume a worst case scenario for extreme or
11 extremely conservative interpretations of the available
12 scientific evidence, that there is a clearly apparent no
13 NOAEL in human of around .5 milligrams of manganese per
14 cubic meter.

15 There is at least a 100-fold safety margin from
16 NOAEL human data, which is very reassuring indeed and by
17 far exceeds the usual procedures involved to estimate and
18 evaluate potential risks to public health.

19 Thank you, ladies and gentlemen of the panel.
20 I stand ready to answer any questions.

21 MR. WILSON: Thank you very much.

22 MR. DAVIS: Dr. Kolbye, I'm curious, you
23 referred several times to -- well, you didn't refer to a
24 lack of NOAEL but in fact to a NOAEL and I'm wondering
25 where in fact you derive the NOAEL that you cite here?

1 DR. KOLBYE: If one reviews all the data from
2 humans, I see no evidence that there is any adverse
3 effect associated with air levels of manganese that are
4 below .5 milligram per cubic meter. If one then goes to
5 the Swedish data that were presented down at RTP, and if
6 one goes to the testing methodologies used by the Swedish
7 investigators, I am not convinced at that level -- which
8 involved roughly half a milligram to several milligrams
9 per cubic meter of air occupational exposure -- was
10 really associated with a threshold. I'm willing to be
11 open-minded in that regard and that's why I use the
12 statement of 0.5 milligram per cubic meter.

13 MR. DAVIS: Just a point of clarification. In
14 fact, the RfC that you referred to was not based on a
15 NOAEL. There was a lack of a NOAEL.

16 DR. KOLBYE: That's correct.

17 MR. DAVIS: And therefore, it required an
18 additional and surrogate factor.

19 DR. KOLBYE: But you see, here is where I have a
20 difference of opinion, that in a very shallow slope free
21 zone to say that there is no adverse effect level is
22 tantamount to saying there is no adverse effect level for
23 mashed potatoes or gravy. All our experience in
24 toxicology and epidemiology tell us that only at high
25 levels of manganese do humans incur problems. Our

1 knowledge of biochemistry and nutrition tells us that
2 manganese is a very important constituent for normal body
3 enzymes.

4 Obviously, between what is needed by the body
5 to function normally and what poisons the body is a gray
6 zone where the more information we have the better, but
7 what I am really saying as a professional is that I know
8 of no evidence to indicate that there's any serious
9 problem whatsoever with airborne exposures to manganese
10 that are at or under .5 milligram per cubic meter.

11 MR. DAVIS: Do you see any reason to
12 distinguish between manganese in general and Mn_3O_4 ?

13 DR. KOLBYE: One can investigate further the
14 effect of the different states of oxides and go for
15 equivalence. This was a matter that was brought up at
16 RTP in some way to try to factor in the various states of
17 oxidation and the various compounds. I think that is
18 worthwhile for reassurance, but I do not see any major
19 problem in that regard of any great disparity between
20 these various states.

21 Furthermore, I point out that a lot of the
22 research studies by injection, either intravenous or
23 subcutaneous, were using manganese chloride which has
24 different properties, especially when injected in the
25 body, as compared to inhaling particulates of manganese

1 oxides and they're adsorbed on whatever they are.

2 MR. DAVIS: Thank you.

3 MR. ATKINSON: You cited a likely increase in
4 the background levels of around .05 micrograms per cubic
5 meter?

6 DR. KOLBYE: My point is most background
7 information, with the exception I think of Los Angeles,
8 is about .03, maybe .04, maybe lower, .02, micrograms per
9 cubic meter. The anticipated human additional air levels
10 would approximate .02, maybe .03, micrograms. So
11 background, let's say is roughly .02, .03, with the
12 addition of manganese into air resulting from use of MMT,
13 it would come up to about .05 micrograms per cubic meter.
14 What I'm really saying then is you're almost within
15 background.

16 MR. ATKINSON: My question, however, is could
17 you comment on what levels we might anticipate in certain
18 microenvironments where exposures could be higher?

19 DR. KOLBYE: Conceivably you could have slightly
20 higher exposures, and in my statement I mention what one
21 could do is monitor those microenvironments. Personally
22 and professionally, I would be very surprised to see
23 those microenvironments have anything approximating say a
24 doubling of .05 to .1 micrograms. I'd be surprised if it
25 goes over that, but what I'm really saying is that can be

1 monitored and if particular problems arise with
2 ventilation or exposure, they can be addressed sensibly
3 and effectively.

4 MR. ATKINSON: Thank you.

5 MR. WILSON: Thank you very much, Dr. Kolbye
6 for your testimony.

7 DR. KOLBYE: Thank you.

8 MR. WILSON: Next is Mr. Scott Pattison of
9 Consumer Alert.

10 STATEMENT OF SCOTT PATTISON

11 ON BEHALF OF CONSUMER ALERT

12 MR. PATTISON: Good morning. I want to thank
13 the members of the EPA Advisory Panel for affording to
14 Consumer Alert the opportunity to represent the views of
15 the average American consumer concerning Ethyl
16 Corporation's application for waiver for the introduction
17 of a manganese-based fuel additive.

18 There are numerous technical experts here today
19 so I'll just confine my remarks simply to the consumer
20 viewpoint. I'll be very brief.

21 I'm Scott Pattison, Director of Consumer Alert.
22 Founded in 1977, Consumer Alert is an independent,
23 nonprofit, nonpartisan organization with members in all
24 50 States. I'm very pleased to be here to represent the
25 views of thousands of Consumer Alert members across the

1 country.

2 Consumer Alert, in fact, frequently appears
3 before public hearings such as this to give simply the
4 consumer viewpoint. Consumer Alert adheres to a very
5 strict policy of never endorsing any consumer product.
6 We are merely appearing here today to point out that
7 consumers do benefit from new technology and that new
8 innovative technology and products beneficial to
9 consumers should never be denied introduction into the
10 marketplace unless there are valid scientific reasons
11 that justify preventing their use. These scientifically-
12 based reasons could include, for example, health and
13 safety considerations or product ineffectiveness.

14 Consumer Alert has a long history of supporting
15 and encouraging development of innovative, new
16 technologies and products. New technologies lead to
17 numerous benefits for consumers. New technologies lead
18 to improved products, a cleaner environment, increased
19 efficiency and lower prices.

20 As a group representing consumers nationwide,
21 we are particularly encouraged by any new technology or
22 product that will assist communities in attaining the
23 clean air standards and we encourage development of any
24 such technology.

25 We understand that Ethyl has submitted an

1 enormous amount of data to the EPA and this data, we are
2 told, has been carefully gathered and scrutinized. The
3 company claims that the data demonstrates that the
4 product can attain an overall reduction in regulated
5 pollutants. This includes reductions in carbon monoxide
6 and other emissions. These results are truly impressive.
7 We are also impressed with potential smog reducing effect
8 of the fuel additive.

9 Let me add as an aside, just driving in this
10 morning I heard on the radio a member of the Metro Area
11 Council of Governments in this area say he had no idea
12 how this area would ever meet the Clean Air standards.
13 So this type of product may be a beneficial new
14 technology that could assist in that area.

15 The testing data submitted to the EPA also
16 holds the promise of decreasing U.S. dependence on
17 foreign petroleum and the submitted data indicates that
18 the performance additive can produce and estimated
19 savings of as much as 82,000 barrels of crude oil per
20 day. The company also indicates that the data
21 demonstrates that the additive can be used without
22 harming the emission control devices on automobiles.

23 All this is potentially very good news for
24 consumers who seek a clean environment, decreased oil
25 imports, and also wish to keep the cost of new cars and

1 gas low. These are very important concerns for
2 consumers.

3 I think, however, the most important point to
4 make about this application is the fact that this product
5 is not necessarily entirely new but actually has been
6 used in Canada for years.

7 In environmental issues as well as many other
8 issues, there's often a lot of political postering and
9 rhetoric. The scientific data and the claims of the
10 product are all subject to review and we are confident at
11 Consumer Alert that you will give them a fair and
12 impartial review. We merely ask, on behalf of all the
13 consumers in this nation, that the test data submitted by
14 the company receive a very rigorous but fair review on
15 the merits and be in accord with the proper standards by
16 which it is to be judged.

17 Any final determination regarding this waiver
18 application should be determined by the scientific data.
19 Consumer Alert is confident that this will be the case
20 with this particular waiver application.

21 I appreciate the opportunity to present the
22 views of the average consumer and I'll be happy to answer
23 any questions that you might have.

24 MR. WILSON: Thank you very much for your
25 testimony.

1 Do you have any reaction to the previous
2 testimony, particularly that of the Motor Vehicle
3 Manufacturers?

4 MR. PATTISON: Well, I think it's important.
5 My reaction is, I must confess that Consumer Alert
6 appeared at a variety of hearings like this and we're not
7 technical experts, so I have to be careful about anything
8 I say. I'd simply merely say that speaking on behalf of
9 the average consumer, we hope that you look at all the
10 data and that is very important data to look at.

11 MR. WILSON: Thank you very much.

12 MR. PATTISON: Thank you.

13 MR. WILSON: The next witness and as far as we
14 know the last party seeking to testify this morning is
15 Ethyl Corporation.

16 STATEMENT OF DR. DON LYNAM
17 ON BEHALF OF ETHYL CORPORATION

18 DR. LYNAM: Good morning.

19 I am Donald R. Lynam, Director of Air
20 Conservation and Industrial Hygiene for Ethyl
21 Corporation. I'm here to speak briefly in support of
22 Ethyl's waiver application for HiTEC 3000 Performance
23 Additive.

24 With me today on the panel are F. William
25 Brownell of Hunton & Williams, Ethyl's counsel, and Ralph

1 the core test program designed in consultation with the
2 three major U.S. automobile manufacturers and staff of
3 the U.S. Environmental Protection Agency.

4 This test program generated thousands of
5 emission measurements from 48 cars operated for a total
6 of more than 3 million miles, half of the cars using a
7 test fuel containing the additive, and half using the
8 same test fuel without the additive. All Ethyl tests
9 were carried out by two independent laboratories.

10 Second, the waiver application describes the
11 results of testing to determine what impact, if any, use
12 of the additive has on materials used in automotive fuel
13 and emission control systems, including catalytic
14 converters.

15 Third, it provides an analysis of emissions
16 associated with use of the additive to determine whether
17 use of the additive would affect public health.

18 First, I'd like to focus on the major findings
19 of the 48-car test program and analysis. This program
20 involved use of the additive over the course of 75,000
21 miles of vehicle operation and showed reduced nitrogen
22 oxide, on the average, by 20 percent -- 0.11 gram per
23 mile.

24 Carbon monoxide emissions were reduced, on
25 average, by 7 percent -- .22 gram perm mile. While

1 hydrocarbon emissions increased slightly for the vehicles
2 using the additive, this small effect was not significant
3 because it did not cause or contribute to the failure of
4 the test vehicles to meet the hydrocarbon emission
5 standards.

6 Overall, total regulated emissions for vehicles
7 operating on fuel containing the additive, were lower, on
8 average, than clear fuel vehicles by about 8 percent, or
9 .3 grams per mile.

10 Notwithstanding these impressive test results,
11 some automobile companies maintain that additional
12 testing must be completed before EPA can approve the
13 waiver application. These companies seem to have two
14 basic concerns.

15 First, they suggest that in light of the more
16 stringent emission standards established by the Clean Air
17 Act Amendments of 1990, any increase in hydrocarbon
18 emissions, no matter how small, is unacceptable. Second,
19 they suggest that use of the additive will adversely
20 affect the operation of the catalytic converters.
21 Neither claims withstand scrutiny.

22 With respect to the first issue, tested
23 completed by Ethyl establishes that use of the additive
24 will not cause or contribute to the failure of emission
25 control devices or systems to meet existing emission

1 standards.

2 Testing and analysis also demonstrated that
3 technology adequate to meet the more stringent emission
4 standards already exists in a wide array of vehicle types
5 and that use of the additive in vehicles equipped with
6 such technology will not cause or contribute to the
7 failure of vehicles to meet these more stringent
8 standards.

9 Indeed, all of the vehicles in Ethyl's test
10 fleet which remained below the existing hydrocarbon
11 standard over the course of 75,000 miles of vehicle
12 operation would also have met the more stringent
13 hydrocarbon emission standards. This result applies even
14 though these vehicles were not designed to meet the more
15 stringent hydrocarbon emission standard of the future.

16 Given the availability of this proven
17 technology, the claim that any increase in hydrocarbon
18 emissions, however small, will jeopardize compliance with
19 the future hydrocarbon emission standard is without
20 merit.

21 As for the catalytic converters, the data do
22 not support the assertion that use of the additive will
23 adversely affect their operation. While use of the
24 additive results in some deposition of manganese oxide on
25 catalytic converters, testing done by Ethyl has

1 repeatedly shown that this deposition does not affect the
2 operation of the converter.

3 In-use conversion efficiencies for test
4 vehicles fueled with the additive are either the same as,
5 or better than, those for clear fuel vehicles, while
6 catalytic converter back pressures remain unchanged.

7 In response to suggestions from the auto
8 industry, Ethyl initiated additional testing of the
9 catalytic converters used in the 48-car fleet test.
10 Results from these tests which included testing of
11 catalytic converters on a common "slave" engine and
12 extreme, high temperature and high speed testing of the
13 additive in a pair of Chevrolet Corvettes equipped with
14 close coupled catalysts, confirm that use of the additive
15 does not plug or otherwise adversely affect catalytic
16 converter operation.

17 I'd like to now turn to three specific issues
18 raised by EPA in the fall of 1990. I will summarize the
19 results of various test programs Ethyl undertook to
20 respond to these issues.

21 These issues were first put into independent
22 laboratories retained by Ethyl to conduct emission
23 testing as part of the 48-car test fleet program produced
24 emission measurements which correlate with EPA's emission
25 measurements.

1 Second was whether manganese emissions
2 associated with use of the additive would adversely
3 affect public health. The third issue was whether use of
4 the additive would substantially increase particulate
5 emissions, as EPA had apparently observed in limited ad
6 hoc testing in August-October 1990.

7 As noted, one issue raised by EPA was whether
8 the hydrocarbon emission measurements obtained by the
9 independent laboratories conducting the 48-car test fleet
10 program correlate with hydrocarbon emission measurements
11 obtained by EPA's Ann Arbor test laboratory. To address
12 this issue, Ethyl and EPA decided and initiated a joint
13 EPA/Ethyl correlation test program to measure emissions
14 from a common set of test vehicles.

15 The results of this joint EPA/Ethyl correlation
16 test program show that measurements of hydrocarbon
17 emissions at the EPA and independent laboratories were
18 equivalent. This result further establishes the validity
19 of the thousands of emission measurements obtained by the
20 independent laboratories as a part of Ethyl's 48-car
21 fleet test program.

22 As I've already noted, the emission data from
23 the 48-car test fleet program clearly show the use of the
24 additive will not cause or contribute to the failure of
25 emission control devices or systems to meet the

1 applicable emission standards.

2 A second issue raised by EPA was whether the
3 inhalation of manganese emissions associated with use of
4 the additive would adversely affect public health. They
5 will not. Since November 1990, several independent
6 studies have established that even maximum manganese
7 exposure levels associated with use of the additive will
8 remain well below the very conservative level deemed by
9 EPA's Office of Research and Development to be protective
10 of public health.

11 This level, known as the inhalation reference
12 concentration, or RfC, for manganese, is .4 micrograms of
13 manganese per cubic meter of air and represents the
14 atmospheric concentration of manganese for which
15 individuals, including sensitive subpopulations, could be
16 exposed over a lifetime without appreciable risk of
17 adverse health effects.

18 Based upon conservative exposure models, two of
19 these independent studies indicate that average ambient
20 levels of manganese in urban areas around the nation,
21 assuming widespread use of the additive, would be about
22 .05 micrograms per cubic meter, a level almost one-tenth
23 the manganese reference RfC. Manganese exposures for the
24 most highly exposed population segment would also be well
25 below ORD's RfC for manganese, totalling at most no more

1 than .2 micrograms per cubic meter.

2 I should note that these modeled estimates are
3 based on as much as 30 percent of the manganese in the
4 fuel being emitted from the tailpipe. Use of this 30
5 percent figure is conservative because it is based on the
6 results of the manganese balance analysis conducted by
7 Southwest Research Institute in San Antonio, Texas using
8 a driving cycle designed to maximize manganese tailpipe
9 emissions.

10 By contrast, all available manganese emission
11 data obtained for normal urban driving conditions,
12 including measurements obtained by EPA, establish that
13 about 10 to 15 percent of the manganese in the fuel would
14 be emitted in urban areas. The modeled estimates I've
15 described therefore reflect the use of worst case
16 assumptions.

17 In yet a third independent exposure assessment,
18 Ethyl undertook a personal exposure monitoring program in
19 Toronto, where use of the additive is permitted in
20 gasoline at up to twice the concentration sought in this
21 application.

22 The results of this monitoring program show
23 that the modeling results I just reported are indeed
24 conservative. These results show that use of the
25 additive, even after more than 10 years of general use,

1 does not increase exposure to manganese much above
2 background levels, and that the exposure levels of
3 individuals, such as cabdrivers exposed to high levels of
4 automotive emissions are only about one-tenth of the
5 manganese RfC. The mean air levels for office workers
6 was .013 micrograms per cubic meter and for cab drivers
7 .035 micrograms per cubic meter.

8 Finally, you've heard me characterize the
9 manganese RfC of .04 as very conservative. In deriving
10 the manganese RfC, ORD assumed that the manganese
11 exposures had increased over time for workers at the
12 industrial plant examined in the health study on which
13 the RfC is based. The authors of that study, as well as
14 managers of the relevant industrial facility, however
15 have reported that manganese exposures at the plant have,
16 if anything, remained constant over time.

17 This means that ORD's manganese RfC should more
18 accurately be about three times higher, or about 1.2
19 micrograms per cubic meter. This level is more
20 consistent with those deemed to be protective of public
21 health by other independent health organizations such as
22 the U.S. Public Health Service's Agency for Toxic
23 Substances and Disease Registry which has recommended a
24 level of 2 micrograms per cubic meter and the World
25 Health Organization's Air Quality Guideline for manganese

1 of 1 microgram per cubic meter.

2 Exposures to manganese associated with use of
3 the additive fall even further below these more accurate
4 levels for protection.

5 We conclude from these exposure analyses that
6 there is no basis upon which to conclude that manganese
7 emissions associated with use of the additive would
8 increase exposure significantly or consequently affect
9 public health.

10 Finally, based on the results of limited ad hoc
11 testing conducted in August to October 1990 and March to
12 May 1991, EPA questioned whether use of the additive
13 might substantially increase total particulate matter
14 emissions.

15 Additional testing and analysis completed by
16 Ethyl since November 1990 make clear that the additive
17 will not materially increase total particulate matter
18 emissions.

19 First, testing completed by Ethyl, and recently
20 confirmed by EPA, establishes that the fuel containing
21 the additive used by EPA as part of its ad hoc test
22 program was contaminated with Freon 12, a common
23 chlorofluorocarbon refrigerant.

24 Further testing by Ethyl, and more recently by
25 EPA, also confirms that the presence of Freon 12 in

1 gasoline increases the emission of total particulate and
2 hydrocarbons. Thus, the gaseous and total particulate
3 emission data from EPA's ad hoc test programs are now
4 irrelevant to a decision Ethyl's waiver application.

5 Second, as part of the joint EPA/Ethyl
6 correlation test program, the independent laboratories
7 and the EPA Ann Arbor lab measured emissions of
8 particulate matter using a common, uncontaminated test
9 fuel and a common set of test vehicles.

10 As with the gaseous emission correlation
11 program, particulate emission measurements of the EPA
12 independent laboratories were equivalent of using the
13 uncontaminated fuel. These particulate measurements were
14 also fully consistent with the results of an extensive
15 particulate matter emission test program conducted by
16 Southwest Research Institute.

17 The SARI test program showed that use of the
18 additive had no significant effect on particulate
19 emissions. Use of the additive increased particulate
20 emissions by about 0.003 grams per mile, on average,
21 increasing baseline particulate emissions from about .008
22 to 0.011 gram per mile.

23 This is an insignificant effect considering
24 that there currently is no particulate emission standard
25 applicable to gasoline-powered light duty motor vehicles

1 and that the standard applicable beginning in 1994 is
2 almost ten times higher, or 0.08 gram per mile.

3 Turning now to a brief discussion of the Motor
4 Vehicle Manufacturers Association testimony, I want to
5 reemphasize that Ethyl's tests of the additive, several
6 designed in consultation with EPA and the principal one,
7 with the 48-car test fleet, with the auto companies --
8 have been extraordinarily diverse and comprehensive by
9 any reasonable measure.

10 Ethyl's tests have been far more extensive than
11 any so far conducted by private, commercial, or
12 governmental interests, including those just completed by
13 Ford. Ethyl's tests have included:

14 Emission testing over 75,000 miles on each of
15 48 cars, eight different models, six cars per model,
16 three operating on clear fuel, three operating on MMT
17 fuel;

18 Catalyst durability testing extended over
19 100,000 miles on General Motor Corsicas, 25,000 miles at
20 100 miles per hour constant speed, on General Motor
21 Corvettes, and 35,000 miles at up to 80 miles per hour on
22 Ford Crown Victorias;

23 Joint Ethyl-EPA emission correlation tests on a
24 variety of test vehicles;

25 Fuel specific tests, some involving EPA, which

1 demonstrated no adverse differences between commercial
2 and certification fuels blended with the additive; and

3 Tests with MTBE and ethanol showing both
4 compatibility and an additional likelihood of benefits
5 from use of the additive.

6 The results of these extensive tests uniformly
7 show that use of the additive will not cause or
8 contribute to the failure of emission control devices to
9 meet applicable emission standards.

10 The Ford test program described by the MVMA
11 panel, by contrast, is very limited, and used a very
12 severe durability driving cycle strikingly different from
13 that used for vehicle certification. I'm not sure from
14 the remarks made this morning whether Ford was asking EPA
15 to develop or adopt that cycle for certification or
16 testing of the vehicles.

17 While Ethyl has had little time and only
18 partial information upon which to comment on the recent
19 eight-vehicle test conducted by Ford, a preliminary
20 review suggests substantial uncertainties.

21 First, the data generated by Ford are very
22 limited when compared to the data generated by Ethyl. In
23 comparison to the thousands of emission data points
24 obtained as part of Ethyl's 48-car test fleet program
25 over the course of over three million miles of vehicle

1 operation, Ford has reported only about 120 emission data
2 points for eight vehicles and only four vehicles
3 operating on MAT.

4 Second, Ethyl used a much more rigorous test
5 protocol than did Ford, and was thus able to conduct the
6 statistical analyses traditionally applied by EPA to
7 determine whether an additive causes or contributes to
8 the failure of emission control devices to meet
9 applicable emission standards. These traditional
10 analyses and other more powerful statistical analyses
11 uniformly show that the additive meets the Section
12 211(f)(4) standard for use of new fuel additives.

13 Ford, by contrast, attempted only to discern
14 whether use of the additive in a limited number of test
15 vehicles had an adverse effect on emissions.

16 Third, Ford has generally limited its analysis
17 of emission effects to a description of differences
18 attributed to use of the additive without supplying the
19 underlying data from which these differences were
20 calculated and independent comparisons made. Without
21 full details of actual vehicle tailpipe emission
22 measurements, neither the Agency nor Ethyl, is in a
23 position to judge fully the merits of the Ford analysis.

24 Fourth, because of the small number of vehicles
25 tested, the limited data provided by Ford are difficult

1 to interpret. Results from Ethyl's 48-car test fleet
2 program showed that emissions can vary substantially from
3 one measurement point to another, even within as little
4 as 5,000 miles of vehicle operation.

5 This variation can be seen in the emission
6 results for the Ford Crown Victoria used in Ethyl's test
7 program. This slide shows that at the 30,000 and 50,000
8 mile measuring points vehicle emission trends changed
9 substantially. Had Ethyl's emission testing been limited
10 to these two mileage points, conclusions drawn would have
11 been strikingly different.

12 It is axiomatic that as the numbers and
13 varieties of data points and test vehicles decrease, the
14 chances for anomalistic results and shaky statistics
15 increase exponentially. Ethyl measured emissions of 48
16 cars every 5,000 miles. Ford measured emissions of 8
17 cars at about 25,000 mile intervals. One example of
18 questions by thin data is the emission numbers for the
19 four Ford Explorer test cars shown in Table II of Ford's
20 September 1991 submission to the EPA docket regarding
21 particulates. This particular table had test numbers for
22 the gaseous pollutants at certain mileage intervals not
23 complete for all the test vehicles.

24 At 55,000 miles, one of two clear fuel vehicles
25 had average HC emissions of 0.154 grams per mile. The

1 other twice that: 0.353 grams per mile. Similarly, a
2 wide spread exists between the two MAT cars. Gives these
3 high car to car variations, it is speculative to infer
4 that the differences seen are attributable to use of
5 HiTEC 3000.

6 While we have that slide up, I just would like
7 to take a minute to point out that this morning Ford
8 stated that the Explores operating on MAT failed the
9 hydrocarbon emissions standards at 100,000 miles. I'd
10 just like to point out here that the clear cars failed
11 the carbo monoxide standard at some place less than
12 55,000 miles, the carbon monoxide standard being 3.4
13 grams per mile.

14 Ethyl tested three clear and three additive-
15 fueled vehicles for each car model in its test fleet in
16 order to eliminate or diminish the uncertainties caused
17 by the vehicle-to-vehicle variability that appears to be
18 exhibited in the Ford test program. Six Ford Escorts
19 were included in Ethyl's more rigorous test program.
20 Results for these test vehicles contrast with the
21 emission results reported by Ford for its four test
22 vehicles. The first slide shows the results of the three
23 cars operated on clear fuel used in the Ethyl waiver test
24 program. The bottom slide shows the three test cars
25 operated on HiTEC 3000. Also, the Ford results are shown

1 for both clear fuel and MAT fuel.

2 The bottom plot here shows the average of the
3 HiTech cars and the average of the three clear cars from
4 the Ethyl test group and while there are car
5 variabilities among the three test cars, the averages are
6 essentially the same from an emissions standpoint. This
7 shows how individual cars can vary and the need to have
8 at least three cars per fuel type to detect trends.

9 Preparatory to the fleet test, Ethyl tested
10 four Chevrolet Corsicas, two on HiTEC 3000 fuel, over
11 100,000 miles. This slide shows the hydrocarbon
12 emissions results. No emission standards were exceeded
13 and hydrocarbon emission differences for the two sets of
14 vehicles were inconsequential.

15 We point this out because we only included the
16 car Ethyl test fleet. This was done preparatory to the
17 test fleet and the cars had been rolled to 100,000 miles.

18 A final slide, by way of review, displays the
19 net, averaged differences in emissions between clear and
20 HiTEC 3000 fuels during Ethyl's 48 car, 8 model test
21 fleet over 75,000 miles -- 25,000 miles beyond the
22 designed operating limit of the emissions control
23 systems. Emissions were measured every 5,000 miles.
24 Anomalies, which were few, were thoroughly explored.
25 Rigorous statistical procedures by outside consultants

1 were applied in producing the data used in the slide.

2 Ethyl recognizes that an applicant for a waiver
3 has the burden of proof of providing data in support of
4 the Section 211(f)(4) standard. It stands to reason,
5 however, that there is also a burden on those who contest
6 an applicant's data -- namely, their critical analyses
7 must stand up to equally close scrutiny.

8 Ethyl does not believe that based on the
9 available data that the recent Ford test program, as it
10 pertained to the additive, was sufficiently controlled,
11 objective and statistically sound to override or
12 contradict the considerable data developed by independent
13 laboratories on behalf of Ethyl.

14 The automobile companies have consistently
15 opposed fuel additive waiver applications on the grounds
16 that any non-hydrocarbon additives posed threats to the
17 operation and longevity of automobiles. Such opposition,
18 however, did not dissuade the Agency from approving the
19 waiver applications for gasohol, MTBE, or other
20 oxygenates where in fact the evidence in support of the
21 applications was less extensive or convincing than that
22 provided by Ethyl.

23 Ethyl shares the concern of the auto industry
24 regarding the need for approval of only fuel additives
25 which meet the Section 211(f)(4) standards. Ethyl has

1 attempted in good faith and will so continue to work with
2 the automobile companies.

3 Meanwhile, Ethyl will critically examine the
4 data generated by the auto industry, just as the auto
5 industry has critically reviewed Ethyl's test data.
6 Ethyl will submit detailed comments on the Ford tests as
7 soon as feasible following receipt of the complete sets
8 of data. We would ask that Ford would provide to EPA, to
9 Ethyl and to other interested parties details of the
10 testing.

11 Before concluding, let me emphasize that the
12 results of preliminary testing conducted by Ethyl show
13 that use of the additive can increase the emission
14 reductions associated with the oxygenated fuel additives.
15 Emissions testing of oxygenated fuel additives has shown
16 that such additives result in increases in nitrogen oxide
17 emissions.

18 The results of Ethyl's testing and analysis
19 have shown that the benefits seen with the Howell EEE
20 test fuel, including the nitrogen oxide emission
21 reduction, continue to be found when the additive is used
22 in oxygenated fuels.

23 Ethyl is continuing to conduct tests at the ALI
24 Test Laboratory in Chicago, Illinois to develop further
25 data on the potential synergistic benefits of using the

1 additive and oxygenates in combination in unleaded
2 gasoline.

3 The NO_x emissions reduction associated with use
4 of HiTEC 3000 has the potential for giving refiners
5 substantial flexibility in meeting the reformulated fuel
6 and anti-dumping standards of the new Clean Air Act.

7 In conclusion, Ethyl's efforts in support of
8 this request for a fuel additive waiver have been
9 unprecedented in terms of scope and detail, and have been
10 subjected to a level of scrutiny by the Agency far beyond
11 anything required for approval of any other fuel
12 additive.

13 The exhaustive testing and statistical analyses
14 performed by Ethyl, and described in detail in the waiver
15 application, not only demonstrate that the additive meets
16 the statutory standard for granting a fuel additive
17 waiver, but show that the use of the additive will result
18 in significant health, environmental and energy benefits.

19 Thank you for the opportunity to testify. My
20 colleagues and I would be happy to answer any questions.

21 MR. WILSON: Thank you very much for your
22 testimony. I must say before we get into some questions
23 I have to compliment Ethyl on your efforts over the years
24 now to provide us with vast amounts of information and
25 your willingness and openness to work with us and others

1 as the issues have come up to develop testing programs
2 and deal with them openly and forthrightly.

3 DR. LYNAM: Thank you. We appreciate that. It
4 has been too many years.

5 MR. WILSON: I'm sure it must seem like a
6 never-ending process to everyone, particularly to you
7 all. Nevertheless, obviously we have to view these
8 applications to assure that the new additives aren't
9 going to create a public health problem or cause negative
10 effects to the emission control program we have for motor
11 vehicles.

12 Just picking up on the latter point on
13 compatibility with oxygenates, are you all seeking at
14 this point to use MMT as an additive to reformulated
15 gasoline?

16 DR. LYNAM: Not at this point. Hopefully, that
17 would be our next step.

18 MR. WILSON: I guess I'd like to ask a couple
19 of questions related to the Ford information. First of
20 all, I might just ask Ford, do you intend to provide the
21 raw data to us and to Ethyl?

22 MR. KULP: Yes, we will. We need to complete
23 the last vehicle data.

24 MR. WILSON: You mentioned the concern about
25 the way in which the vehicles were driven to do mileage

1 accumulation. Can you be more explicit about why you
2 think that's an unreasonable approach?

3 (Overhead projector noise distorts Dr. Lynam's
4 answers considerably.)

5 DR. LYNAM: Ford used a much more severe cycle
6 than is used I believe in both the certification and
7 testing. The cycle involved approximately 80 percent at
8 65 miles per hour. I believe the average speed was about
9 54 miles per hour, while the average speed for the
10 certification cycle was something -- (Inaudible).

11 MR. WILSON: Do you have reason to believe --
12 do you have a technical reason to believe that difference
13 would have an effect on emissions?

14 DR. LYNAM: No, I don't.

15 MR. WILSON: It's just a difference you've
16 noted.

17 DR. LYNAM: It's a difference that we pointed
18 out. I believe certainly a more severe cycle -- I'm not
19 sure what the effect, if any, there is with regard to the
20 -- differences.

21 MR. WILSON: Do you have a suggestion as to how
22 we should proceed to try and understand the significance
23 of the Ford data and how to determine why that difference
24 exists between that data and your data and whether it's
25 significant, and what effect it should have on the waiver

1 application?

2 DR. LYNAM: I think I would prefer to wait
3 until we get the individual raw data and to have an
4 opportunity to evaluate those before making any
5 recommendation at this point. The thing I think you have
6 to realize is how sparse the Ford data are. You have
7 essentially five mileage measuring points for over
8 105,000 miles on only four vehicles, two different
9 models, operating on the MMT.

10 So I have some real concerns about that amount
11 of sparse data and just from the wide scattering of the
12 data, it certainly appears that there is a car-to-car
13 effect rather than a fuel additive effective.

14 MR. PERRY: Ladies and gentlemen, I'm Newton
15 Perry. In response to your question, let me say we
16 understand your problem, we understand our colleagues
17 from Ford and the Motor Vehicle Manufacturers Association
18 coming to technical difficulties and different decisions
19 than we came to with our study.

20 What Don said is essentially and totally
21 correct. Without the data, car-by-car, it would be very
22 difficult to make an assessment of potential merits of
23 the paper and the conclusions they reached. I'm not a
24 technical person, I'm not a scientist. I would certainly
25 be the last person Ethyl would send here to defend our

1 paper vis a vis the Ford paper.

2 If I were a scientist, and I were technically
3 prepared, today we simply couldn't do it. We don't have
4 enough data. We are not sure that you folks do.
5 However, what I can tell you, as you well know and we've
6 all said it before, is we've been as cooperative and as
7 open with you folks, with our friends in the auto
8 industry, and other interested parties as we know how to
9 be.

10 We have before you a waiver application
11 including something like 3 million driving miles. Our
12 data indicates different conclusions than our friends
13 from Ford reached. We didn't choose the test procedures
14 in a vacuum, we consulted with you folks a great deal, in
15 some respects with the auto companies, we didn't choose
16 the fleet of test vehicles in a vacuum, nor did we chose
17 the fuel we used in a vacuum. We did the best scientific
18 job we know how to do.

19 If I have to answer any question at all on the
20 Ford data, I would simply tell you that I don't think the
21 data we've seen presented in any respects enables you to
22 draw the conclusions over time that they've drawn. We
23 share your concern for any deleterious effect to car
24 emission systems, to public health, to the environment.

25 We say to you that not only in our opinion, and

1 as our waiver application, in our judgment, clearly
2 shows, HiTECH 3000 is defensible but additionally, we are
3 convinced the data shows it is the right product at the
4 right time for the driving public.

5 We will, of course, respond in writing to those
6 points in the Ford paper that require a response. How
7 you make your decision, I can only say you have rules and
8 regulations in place and we know you'll fully well
9 evaluate each point and each claim based on the data you
10 have before you.

11 Thank you.

12 MR. WILSON: Thank you for that comment. I
13 guess just to put it in a bit of perspective, we do have
14 a time constraint here, so we need to evaluate all the
15 information. As we said, anybody's ideas as to how we
16 can discern the truth here when we run into differences
17 in data would be most welcome.

18 MR. PERRY: We appreciate that and we would
19 encourage our friends to get us the data and you folks
20 the data as soon as possible.

21 MR. WILSON: I'd just comment again on why we
22 view the difference as so significant. Dewey Mark
23 mentioned, when he was here, the reformulated gasoline
24 discussions we all spent a lot of time in and those are
25 going to result in consumers probably paying an extra

1 nickel a gallon in many of our cities in order to achieve
2 a 15 percent reduction in motor vehicle hydrocarbon
3 emissions. Ford suggested that its data indicates a 30
4 percent increase in hydrocarbon, so obviously it's a
5 magnitude that if true, would be significant and
6 certainly one that would not be wanted or helpful in what
7 we're trying to do.

8 On the other hand, your data indicates
9 something different and we do want to do the right thing.

10 MR. LAWRENCE: One of the comments you made in
11 your remarks is that the program was designed in
12 consultation with EPA, and the principal one with the
13 auto companies. Was that reviewed with the auto
14 companies? How much input did they provide vis a vis the
15 fuel? Did it have a deposit control additive or did it
16 not? What difference would that make?

17 MR. PERRY: I understand your question. I'm
18 going to let someone respond to that who was here at the
19 beginning of this process. We've been at this long
20 enough now to run through several Ethyl managers.

21 DR. LYNAM: I guess in 1987 when this whole
22 process started, there were meetings and contacts with
23 the auto companies. I personally was not involved in all
24 of those but as part of our submissions last year, one of
25 the appendices was well documented, the meeting dates,

1 what was discussed and various things at those meetings.

2 It's my understanding that the auto industry
3 had a significant impact on the choice of automobiles and
4 it's certainly my understanding that the auto industry
5 was well aware of the test fuel that was being used.

6 MR. LAWRENCE: Just to clarify the fuel that
7 was used was Howell EEE for the whole program?

8 DR. LYNAM: Yes.

9 MR LAWRENCE: And that was including mileage
10 accumulation, there was no mileage control additive?

11 DR. LYNAM: That's right.

12 MR. LAWRENCE: From your data, was any data
13 deleted or excluded from the analysis to make a
14 difference?

15 DR. LYNAM: Absolutely not. I thank you for
16 bringing up that point because that was inferred, I
17 believe, in the comments earlier that Ethyl did not
18 include all data. That is not so. All data were
19 included, you have all the raw data.

20 I think maybe the confusion comes about because
21 in making emission measurements, we initially start out I
22 think making two or three measurements at each 5,000 mile
23 point. This changed because an engineer was doing it and
24 the statistician saw that it wasn't consistent every
25 time, so the statistician took the first two measurements

1 of every time and analyzed the data that way and then
2 analyzed the data using every measurement and there were
3 no differences in the results.

4 SAI was involved in that data analysis. So
5 there were no data omitted at all.

6 MR. PERRY: I might point out the question came
7 up what discussion -- was made? What we had one before
8 the start of this whole program in terms of the protocol,
9 the protocol car group picked to represent as much
10 production as could possibly be done based on -- sales.

11 Those cars were then picked, and fuel was
12 selected by Ethyl for a specific reason -- we knew we had
13 a long period of time to run the tests with 48 vehicles
14 at different locations.

15 This was, as memos will show, these protocols
16 were all reviewed with Ford, GM and Chrysler before
17 started. The gentlemen here may not have been in those
18 meetings. I think that's true. (Inaudible) -- but every
19 manufacturer was aware that we intended to use Howell EEE
20 --

21 MR. LAWRENCE: That was for testing and mileage
22 accumulation.

23 MR. PERRY: Yes.

24 MR. LAWRENCE: Or was there a possibility of
25 we're going to use EPA cert fuel and that can mean to

1 some, if you look in the Federal Register --

2 MR. PERRY: No, no, the fuel is spelled out how
3 it should be used for both emission work and --
4 (Inaudible).

5 VOICE: The EPA talked about it. Dick _____
6 said he was going to send the test protocol out for
7 review at Ann Arbor. Of course that was the prerogative
8 of the staff and that was done, I'm sure. Whether you
9 all commented on it, I don't know. The discussion of the
10 fuel took place several times.

11 MR. PERRY: It was well gone over before the
12 tests were started. The car -- were made based on
13 manufacturers' recommendations.

14 MR. JACKSON: I'm Marvin Jackson from General
15 Motors. I attended I think some of the meetings that
16 Ethyl had with GM.

17 I think it comes as a surprise to us that Ethyl
18 intended to use or did use Howell EEE as a mileage
19 accumulation fuel. We always use Howell EEE or whatever
20 you people purchase as the emission test fuel. We have
21 never considered and never used Howell EEE as a mileage
22 accumulation fuel because it doesn't represent the fuels
23 that are in the marketplace. It doesn't have a deposit
24 control detergent.

25 We think that about 95 percent of the fuels in

1. the marketplace have deposit control detergents. There's
2 a new section in the Clean Air Act that requires all
3 gasolines as of January 1, 1995 to have deposit control
4 detergents.

5 The fuel Ethyl used for mileage accumulation
6 really does not represent the fuels that are in the
7 marketplace right now and certainly doesn't represent the
8 fuels that will be in the marketplace after January 1,
9 1995.

10 MR. LAWRENCE: Question, Marvin. In that
11 situation then when you saw their test program, their
12 test protocol -- I'm not sure if you did -- they said the
13 industry did have a chance, did you comment on that when
14 you saw that they were using Howell EEE for mileage
15 accumulatio?

16 MR. JACKSON: I don't remember them ever
17 telling us that Howell EEE would be used as a mileage
18 accumulation fuel.

19 MR. KULP: Let me clarify, at least on this
20 point, I don't want to go into each of the things Don
21 raised about our program, but with respect to the fuel
22 choice, I think we may have a difference in how things
23 were described to us and how we understood them.

24 I was in the early meetings with Dick Baker,
25 Haran Ghandi (ph), and Charlie Sherwood when Ethyl came

1 to Ford to describe the program. When we were told they
2 were going to use emission test fuels, our understanding
3 was they were going to use the fuels required for
4 emissions testing, and that was the initial discussion.

5 The first time that we understood clearly that
6 mileage accumulation was being done with Howell EEE
7 without detergent additives was after mileage
8 accumulation had begun and we raised a question about the
9 appropriateness of that choice of fuel and whether it
10 would produce valid results. The question was well, we
11 talked to you before, we really don't have the
12 opportunity to change now -- in essence, the die is cast
13 and so we did raise an issue, but I think it may have
14 been either misunderstanding in how it was described to
15 us, but we were not aware that was the mileage fuel.

16 MR. BROWNELL: Let me just say to sort of wrap
17 this up that we're all talking about events in meetings
18 that took place 3 years or better ago and exactly what
19 happened, I think will have to stand on the record and
20 there's been information with the application in response
21 to comments detailing meetings that took place earlier
22 on.

23 I think the basic point with respect to
24 consideration of fuel for the program was that Ethyl was
25 looking for fuel and explained it as looking for a fuel

1 that would minimize the variability introduced by the
2 factors so that we could really focus on what would be
3 the effect of HiTEC 3000 beyond emissions and that was
4 the overriding concern. When you talk about commercial
5 fuels and a 2-year test program, there are going to be a
6 lot of other variabilities introduced that make it
7 difficult to interpret from a statistical standpoint what
8 the effect of the fuel on an issue is going to be.

9 So that was the basic rationale and that's what
10 led Ethyl down this path and the extent to which everyone
11 understood that, it's difficult to tell at this point 3
12 years later.

13 MR. WILSON: I think the key point here will be
14 determining whether or not the existence of the deposit
15 additive in mileage accumulation fuel could be a
16 significant reason why the Ford data shows different
17 results than the Ethyl data.

18 MR. BROWNELL: That's certainly one of the
19 things we'll be looking and responding on. In connection
20 with that, I guess from a broader standpoint, as well as
21 the raw data from the Ford program, we'd like very much
22 to see a full description of test protocol that Ford used
23 so that we can review that in conjunction with analysis
24 of the data.

25 MR. WILSON: Do you plan to provide that?

1 MR. KULP: I think the protocol is contained in
2 the first report in the docket. The detailed data are
3 not all there yet we are not done with the program.

4 MR. BROWNELL: And if we have additional
5 questions about the protocol, I take it we can give you a
6 call and get the information?

7 MR. KULP: Yes.

8 MR. LAWRENCE: Just one other comment. In the
9 work in the last year or so with you and your labs, I
10 find you've been real helpful and cooperative in sharing
11 data and been pleasant to work with. Thank you for your
12 helping us in trying to gather our data.

13 MR. BROWNELL: Thank you.

14 MR. DAVIS: Don, you raised the issue of public
15 health, so I'd like to turn to that briefly.

16 I was very interested to hear about the
17 Canadian exposure study. In fact, I felt we ought to try
18 to obtain more information out of the Canadian
19 experience. I was interested to hear about reference to
20 some of the consumer experience in Canada that I believe
21 motor vehicles manufacturers referred to but in terms of
22 the exposure, let me understand what the actual gasoline
23 concentration was there. You've indicated it's up to
24 twice the U.S. concentration, but what was, in fact, the
25 actual concentration?

1 DR. LYNAM: That's also included in our waiver
2 application because we did go to the refining industry
3 and ask them to let us know what the average level of
4 usage was at the time period when we carried out those
5 personal samples.

6 I think it was something like .04 or .05 grams
7 per gallon. It wasn't up to the limit but it was
8 certainly higher than what we were calling for in the
9 U.S.

10 MR. DAVIS: So we're talking about 1/25 gram
11 per gallon, close to the U.S.

12 VOICE: Between 1/20 and 1/25.

13 DR. LYNAM: It's closer probably to the
14 Canadian than it is to the U.S.

15 MR. DAVIS: Allowed at 1/16 but I think the
16 report indicates -- in fact, I calculated around 1/25 or
17 1/26 grams per gallon but the point really is that it
18 provides a good opportunity for greater comparability to
19 what we might anticipate here if in fact MMT were
20 allowed.

21 DR. LYNAM: I think there are excellent data
22 and the models that have been presented certainly
23 indicate we have narrowed what the exposure possibility
24 might be to a very narrow range.

25 MR. DAVIS: Was there any attempt to speciate

1 any exposure work you might have done? I realize -- the
2 sampling perhaps but has there been any effort -- going
3 back to this point I raised earlier about the distinction
4 between total manganese and Mn_3O_4 because the question we
5 have, that I think has been expressed pretty clearly, is
6 Mn_3O_4 different toxicologically from other compounds. I'm
7 wondering if you have anything that would shed any light
8 on that question?

9 DR. LYNAM: They did not speciate the airborne
10 particulates that were collected there. Previous work
11 has indicated that it's primarily Mn_3O_4 that comes out of
12 the tailpipe. Our reference concentration was based on a
13 study at the largest manganese tetraoxide Mn_3O_4 producer
14 in the world, so there were -- the study RfC is based on
15 exposure to Mn_3O_4 .

16 MR. DAVIS: By the way, you mentioned in your
17 submission reference to that study by Rules (ph), a
18 doctor in Belgium. Was there speciation on that? Do you
19 have any data on that point.

20 DR. LYNAM: They did not speciate but knowing
21 what is produced in the plant where the samples were
22 collected.

23 MR. DAVIS: You also mentioned that you had a
24 letter from Professor Lowery who is the secondary author
25 on that report that was used in deriving RfC. We didn't

1 make an assumption but we relied upon in adding a
2 modifying factor to account for the increase in
3 production levels and therefore the likelihood that
4 previous exposures were somewhat lower was based on the
5 written report that appeared in the Journal, open
6 literature. So we have a situation where you're
7 submitting something that is the report of a plant
8 manager or secondary author on the report versus what we
9 have in print in a peer review journal. It creates
10 something of a dilemma to decide what do you believe
11 here.

12 Normally we like to rely upon peer review
13 published information as opposed to a letter or personal
14 communication.

15 MR. SAINT: You mentioned the use of exposure
16 models for part of your application. I was jus
17 wondering, at the conference that was held in March, the
18 question was raised about the comparability or comparison
19 of these models. Could you tell me which models you used
20 and what effort was made to compare the uncertainties
21 associated with the estimates from those models?

22 DR. LYNAM: Perhaps Ralph Roberson may also
23 want to reply to this, but the lead model using lead,
24 airborne concentrations and -- predict what the exposures
25 would be, a tremendous amount of information reduces the

1 uncertainty, and also the screening model was used.

2 Both models, I think, came out very close to
3 the predictions by the ORD model.

4 MR. SAINT: The shape model?

5 DR. LYNAM: Yes.

6 MR. SAINT: And the uncertainties were similar?
7 I just wanted to get some idea of what the uncertainties
8 associated with those predictions were and how they
9 compared.

10 MR. ROBERSON: My name is Ralph Roberson of
11 Systems Applications. I don't recall that my colleague
12 in San Rafael actually quantified the uncertainties in
13 the screening model which is the model SAI ran. The
14 screening model is fairly different than the approach
15 used by ORD and came up with very similar predictions for
16 the average or mean exposure. So we took some degree of
17 comfort in that as it was being a means of robustness as
18 well as the work that was done independently by Ethyl
19 using what they called their lead model.

20 MR. SAINT: Thank you.

21 MR. DAVIS: You mentioned you're doing further
22 work at ALI in Chicago. What does that stand for?

23 MR. LINANE: Auto Research Laboratories, Inc.

24 MS. SMITH: This is not really a question but a
25 request. Dick mentioned how he'd like you to address the

1 deposit control additive issue and questions have been
2 raised about how you accumulate mileage on the vehicles.

3 Other Ford raised other issues they thought
4 might explain the difference between their results and
5 yours among the systems maintenance, particularly the
6 fuel injectors, the fact that you might have tossed up
7 some outliers.

8 One other thing that we noticed is the
9 difference in you basically accumulated 1,000 miles on
10 your vehicles; Ford accumulated 5,000 as sort of a
11 precondition. If you could address when you submit your
12 written comments all those things. In your mind, are
13 those reasons to differentiate between the data or not.

14 MR. BROWNELL: Many of those we deal with were
15 already addressed in what was submitted but we will go
16 back down the list and put it all together.

17 MR. ATKINSON: A point of clarification. I
18 heard this morning -- Ralph, I guess maybe this question
19 is directed to you -- the initial data compilation, what
20 I heard was there were so many plots and then initial
21 application.

22 Did the data that are represented in those
23 plots include all the data that were collected or the
24 first two of three sets? You said you looked at it both
25 ways and it came out a wash but just for the purposes of

1 my understanding, just what was seen in those particular
2 graphs?

3 MR. ROBERSON: The distinct answer is that
4 those represent the first two measurements made on each
5 vehicle at each mileage point. There were, in some
6 cases, more measurements made. We looked at all the data
7 and we've multiplied it different ways to quantify data
8 points but we're talking on the order of a couple
9 thousand. As you might imagine one or two or three data
10 points are not going to change the conclusions that you
11 draw from 2,000 or 3,000 data points.

12 We felt that it made the analysis less
13 complicated by having to deal in some cases where we had
14 three measurements, then we had to worry about waiting.
15 So we thought the most straightforward approach was to
16 take the first two, which we always had two measurements
17 and in some cases, the field people with the laboratory
18 that maybe they should have measured for again a third
19 time.

20 So we looked at those data and when we looked
21 at all of them our conclusions didn't change but again,
22 to streamline the analysis and to make the variance less
23 complicated, we used the first duplicate measurements for
24 each car at each milestone.

25 MR. ATKINSON: The first on in a temporal

1 sense?

2 MR. ROBERSON: Yes.

3 MR. ATKINSON: There was no effort to pick out
4 the --

5 MR. ROBERSON: No, we didn't take out the fifth
6 and the sixth or the two lowest or the two highest. We
7 took the first two.

8 MR. ATKINSON: Okay. Thank you.

9 MR. BROWNELL: Any further questions?

10 MR. WILSON: No, I think that's all the
11 questions. Thank you.

12 MR. BROWNELL: Thank you very much.

13 MR. WILSON: I guess I might ask before we kind
14 of close the hearing whether anybody from the auto
15 industry had suggestions on procedure at this point?

16 MR. KULP: I would just like confirmation so
17 that if we take one more look at the datasets that have
18 been submitted to the docket by Ethyl, do the data logs
19 that are provided in the appendices to the submission
20 contain all of the data or just the datasets that were
21 used for the evaluation? An example in that regard,
22 there were catalyst deficiency measurements taken in some
23 cases requiring seven, eight or 12 tests run which do not
24 appear in the data logs that we have seen for the
25 sequential testing. So, is there a set of data logs that

1 provide all of the tests that were done?

2 DR. LYNAM: Yes, all the data are in the docket
3 and I think they're identified by -- there may be subsets
4 but we can get that information to you, so you won't be
5 confused.

6 MR. BROWNELL: If you do have questions, let's
7 work it out because we want to make sure you all have all
8 the data.

9 MR. WILSON: That completes all the witnesses
10 that we know of who wanted to appear today. We obviously
11 encourage written comments on the Ethyl waiver
12 application, on today's presentations, on other
13 information that we'll be receiving over the next few
14 weeks.

15 The comment period ends on October 4. Again a
16 reminder, the statutory deadline for a final decision is
17 January 8, 1992. We're going to try our best to sort
18 through the disparate positions on the different issues
19 and the disparate data to make a thoughtful decision at
20 the end of the process, but we encourage everybody to
21 look hard at each other's presentations and to make
22 suggestions to us along with comments as to anything we
23 can do to try and understand better the reason for and
24 significance of differences that appear to exist.

25 With that, I want to thank everybody for coming

1 today and for what I suspect will be efforts between now
2 and January 8th on everybody's part.

3 Thank you.

4 (Whereupon, at 11:25 a.m., the hearing was
5 adjourned.)

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REPORTER'S CERTIFICATE

CASE TITLE: ETHYL CORPORATION FUEL WAIVER APPLICATION

DOCKET NO:

HEARING DATE: SEPTEMBER 12, 1991

LOCATION: ARLINGTON, VA.

I hereby certify that the proceedings and evidence
are fully and accurately recorded in the attached
transcript from the tapes and notes reported by me in
the above case before the:

U.S. ENVIRONMENTAL PROTECTION AGENCY

DATE: SEPTEMBER 12, 1991

Catherine Smith

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